AMENDMENTS TO THE SPECIFICATION

Please amend the specification as follows:

Please replace the second paragraph on page 3 with the following amended paragraph:

The present invention addresses and resolves all of the problems associated with the employment of conventional antimicrobial compositions and/or products. Indeed, it has been surprisingly discovered that a composition incorporating an organic acid or organic acid mixture, a specific short-chain anionic surfactant having at least one of a large, hydrophilic head group; an unsaturated structure; and/or a branched structure; constitutes a viable advancement and alternative in the realm of antimicrobial formulations. The antimicrobial compositions of the present invention are adapted for direct application to human skin, without causing dryness or irritation. Moreover, the antimicrobial compositions of the present invention are designed for use with or without water, and provide immediate and residual effectiveness in either instance against a variety of viruses and bacteria, including rotavirus, rhinovirus, respiratory ~~syricytial~~ syncytial virus (RSV), coronavirus, Gram-positive and Gram-negative bacteria.

Please replace the second paragraph on page 4 with the following amended paragraph:

Against the conventional wisdom in the art, the short chain anionic surfactants of the present invention comprise at least one of the following characteristics: a large, hydrophilic head group; an unsaturated structure; and/or a branched structure. Indeed, the surfactants of the present invention have traditionally been regarded as unsuitable for incorporation into an antimicrobial composition, based on the belief that such surfactants possess relatively low surface activity. Contrary to the traditional wisdom, it has been surprisingly discovered that the surfactants of the present invention deliver enhanced antimicrobial efficacy against rotavirus, rhinovirus, respiratory ~~syricytial~~ syncytial virus (RSV), coronavirus, Gram-negative bacteria and Gram-positive bacteria. More importantly, the large head group, unsaturated structure and/or branched structure of the present surfactants reduces or limits their tendency to penetrate skin tissue, while maximizing the immediate and residual effectiveness of the antimicrobial compositions in which they are incorporated. Further, the anionic surfactants of the present invention

exhibit stability in an aqueous product at a low pH, are compatible with cationic antimicrobial agents and convey strong residual antimicrobial activity when the substrate on which they are applied is later inoculated with virus or bacteria.

Please replace the second paragraph on page 6 with the following amended paragraph:

Preferably, the present organic acids are added directly to the compositions of the present invention in acidic form or are formed by adding the conjugate base of the desired acid and an amount of a separate acid sufficient to form the ~~undissociated~~ undisassociated acid from the base. The antimicrobial compositions of the present invention comprise from about 0.2% to about 70%, preferably about 0.5% to about 40%, more preferably from about 1.0% to about 30%, based on the total weight of the antimicrobial composition, of an organic acid or organic acid mixture.

Please replace the third paragraph on page 6 with the following amended paragraph:

Suitable organic acids of the present invention include, but certainly are not limited to: pyroglutamic acid, adipic acid, gluconic acid, glyconolactone acid, glutamic acid, glycolic acid, glutaric acid, tartaric acid, ascorbic acid, benzoic acid, salicylic acid, citric acid, malic acid, succinic acid, lactic acid, carboxymethylcellulose and mixtures thereof. In another aspect of the present invention, suitable organic acids for incorporation into the present compositions are characterized by a pKa of greater than about 3.0. Without wishing to be bound by theory, the pKa selection limitation of the present organic acids serves the fundamental goal of ensuring that at least 50% of the organic acids incorporated into the present compositions remain ~~undissociated~~ undisassociated at the desired pH of from about 2.0 to about 4.5 (discussed, *infra*).

Please replace the second paragraph on page 7 with the following amended paragraph:

Anionic Surfactant

The anionic surfactants of the present invention constitute a particularly novel and unobvious aspect of the present invention. Indeed, it has been surprisingly discovered

that, contrary to the conventional wisdom in the art, anionic surfactants having a chain length of from about C_4 to about C_{12} and at least one characteristic selected from: a large hydrophilic head group; an unsaturated structure; and/or a branched structure; provide enhanced performance benefits, while minimizing dryness and/or irritation to mammalian skin tissue. The short chain anionic surfactants of the present invention exhibit phase stability in formulation, compatibility with other antimicrobial agents and residual efficacy of the antimicrobial compositions in which they are incorporated. Without wishing to be bound by theory, it is believed that the interaction of short chain anionic surfactant with the phospholipid cell membrane of bacteria and virus, facilitated by the protonation of carboxylate ~~funtionalities~~ functionalities at the surface of the membrane, disrupts the membrane and denatures cellular proteins, thereby providing rapid microbiocidal activity.

Please replace the first paragraph on page 8 with the following amended paragraph:

To reiterate, those of skill in the art have generally avoided the incorporation of so-called "short-chain" anionic surfactants into antimicrobial compositions. This trend is believed to be due in part to the conventional wisdom in the art that short-chain anionic surfactants are characterized by decreased interfacial activity and decreased interaction with the phospholipid membrane of bacteria and virus, and thus, provide poor microbiocidal activity. Accordingly, those of skill in the art have generally relied upon the employment of anionic surfactants with chain lengths of from C_{12} to C_{16} in antimicrobial compositions. The chain lengths of such surfactants are comparable to those of the acyl components in the phospholipid membrane of bacteria and virus, and thus, are thought to provide optimum microbiocidal activity. Moreover, longer chain surfactants have conventionally been thought to be less capable of skin penetration, and thus, less likely to cause dryness and irritation to skin. Nevertheless, conventional, longer chain anionic surfactants often exhibit poor phase stability in an acidic product matrix, incompatibility with cationic antimicrobial agents and decreased residual antimicrobial activity. Conversely, the shorter chain anionic surfactants of the present invention exhibit surprisingly high immediate microbiocidal activity, phase stability in broad concentration ranges of acidic aqueous matrices and compatibility with cationic antimicrobial agents. Importantly, the anionic surfactants of the present invention prevent dryness or irritation

to skin and demonstrate strong residual ~~microcidial~~ microbiocidal activity on a target substrate when the substrate is later inoculated with bacteria or virus.

Please replace the second paragraph on page 14 with the following amended paragraph:

pH of Antimicrobial Compositions

It is fundamental to achieving the benefits of the present invention that the ~~undissociated~~ undisassociated acid from the organic acids disclosed hereinbefore remain on the skin in the protonated form. Thus, the pH of the antimicrobial compositions of the present invention must be adjusted to a sufficiently low level in order to either form or deposit substantially ~~undissociated~~ undisassociated acids onto the substrate for which treatment is desired. By "substantially ~~undissociated~~ undisassociated," it is meant that, upon application of the present compositions onto a target substrate, such as mammalian skin, about 30%, preferably 50%, more preferably 70%, of the organic acids incorporated in said compositions remain ~~undissociated~~ undisassociated following the elapse of about 30 minutes from application. The pH of the present compositions should be adjusted and preferably buffered to achieve the desired range. In another aspect of the present invention, the antimicrobial compositions disclosed herein are characterized by a pH of from about 2.0 to about 4.5, preferably from about 2.5 to about 4.0. Indeed, the pH of the antimicrobial compositions of the present invention will depend upon the precise ingredients incorporated into the subject compositions. Nevertheless, the pH of the present compositions is generally, and preferably, above about 2.0, as compositions characterized by a pH below 2.0 are typically required to be identified as toxic or hazardous materials.

Please replace the first paragraph beginning at page 16 with the following amended paragraph:

The present invention further relates to products that comprise the antimicrobial compositions of the present invention, as well as combinations of such products. Indeed, the combined and systematic use of products containing the antimicrobial compositions of the present invention serves to eradicate viruses (*e.g.* rhinovirus, rotavirus, respiratory ~~syricytial~~ syncytial virus (RSV), coronavirus) and bacteria (*e.g.* Gram-positive and Gram-negative) for a longer period of time and prevent their spread.

Please replace the first paragraph on page 24 with the following amended paragraph:

Method: Assay in vitro skin/ bio skin
Immediate Efficacy:
10 [[uL]] µL of test bacteria suspension was spread on mammalian skin and allowed to air dry for one minute, then 20 [[uL]] µL of the active solution was spread evenly over the treated skin and the preparation was allowed to rest uncovered for five minutes. The skin substrate was placed into a test tube containing 10 mL of extraction solution (Phosphate buffer with Triton X-100, Lecithin and Tween) and vortex for 30 seconds. A 50 [[uL]] µL aliquot was dispensed (via Spiral Biotech Autoplater) onto Trypticase Soy Agar + 1.5% Tween 80 plates and viability was determined after 18 hours of incubation at 37°C (CUF/ml).

Please replace the second paragraph beginning at page 24 with the following amended paragraph:

Residual Efficacy:
20 [[uL]] µL of the active solution was spread evenly over mammalian skin and allowed to dry for 15min. 10 [[uL]] µL of test bacteria suspension was spread evenly over the treated skin and the preparation was allowed to rest covered for five minutes. . The skin substrate was placed into a test tube containing 10 mL of extraction solution (Phosphate buffer with Triton X-100, Lecithin and Tween) and vortex for 30 seconds. A 50 [[uL]] µL aliquot was dispensed via Spiral Biotech Autoplater onto Trypticase Soy Agar + 1.5% Tween 80 plates and viability was determined after 18 hours of incubation at 37 °C (CUF/ml).

Please replace the third paragraph on page 24 with the following amended paragraph:

Method: Solution Assay - Bacterial Time Kill:
A 50 [[uL]] µL of test bacteria suspension (TSB) culture with a density of 1.0E+09 CFUs/ml was mixed with 5 ml of the active solution. After one minute time, the inoculated solution was mixed with DE neutralizing broth (ratio 1:10). A 50-[[uL]] µL

aliquot was dispensed via Spiral Biotech Autoplater onto a Trypticase Soy Agar plate. Viability was determined after 18 hours of incubation at 37°C (CUF/ml).

Please replace the first paragraph on page 25 with the following amended paragraph:

Method: Viral ~~Efficay~~ Efficacy Assay in vitro skin #1013 (IMS) /bio skin black #10
Immediate Efficacy:
10 [[uL]] µL of test virus suspension was spread on the skin substrate and allowed to air dry at room temperature then 25 [[uL]] µL of the active solution was spread evenly over the treated skin and the preparation was allowed to rest for five minutes. Following the exposure period, a sterile 1.5 ml cryovial containing 1.0 ml of elution ~~medioum~~ medium was inverted over the sink substrate surface and extraction was performed. The solution was mixed and serial 10 fold dilution was performed. The dilutions were assayed for the presence of virus in a host system. The virus titer of the stock was determined by the median cell culture infective dose (TCID 50). Cytotoxicity to the host system (active solution) at tested concentrations was also determined. The virus-product mixture was assayed in numerous units of the host system. Median values of log 10 virus inactivation were calculated.

Please replace the second paragraph on page 25 with the following amended paragraph:

Residual Efficacy:
25 [[uL]] µL of the active solution was spread evenly over the skin and allowed to dry for 15 min. 10 [[ul]] µL of the test virus suspension was spread evenly over the treated skin and the preparation remained in contact for five minutes. Following the exposure period, a sterile 1.5 ml cryovial containing 1.0 ml of elution ~~medioum~~ medium was inverted over the sink substrate surface and extraction was performed. The solution was mixed and serial 10 fold dilution was performed. The dilutions were assayed for the presence of virus in a host system. The virus titer of the stock was determined by the median cell culture infective dose (TCID 50). Cytotoxicity to the host system (active solution) at tested concentrations was also determined. The virus-product mixture was assayed in numerous units of the host system. Median values of log 10 virus inactivation were calculated.

Please replace the third paragraph on page 25 with the following amended paragraph:

Method: Microbial Susceptibly Test (MST) for Wet Wipes - Time Kill:
A test wipe was inoculated with 1.0 ml of virus suspension to cover one quarter of the folded wipe. 5 minutes after inoculation the treated wipe was placed into a sterile bag containing 100 ml of DE neutralizer medium, the bag was sealed and placed in the Stomacher for 2 minutes. After blending, a 50 [[uL]] µL aliquot was dispensed (via Spiral Biotech Autoplater) onto Trypticase Soy Agar + 1.5% Tween 80 plates and viability was determined after 18 hours of incubation at 37°C (CUF/ml).

Please replace the third paragraph on page 27 with the following amended paragraph:

To deliver the benefits of the present invention in this form, the towel is applied to any wet skin or hard surface to dry it. The water activates the antimicrobial properties of the composition within the towel, which is then imparted onto the surface. Employing this method, the towel dries the target surface, removes visible dirt, delivers ~~anitmicrobial~~ antimicrobial kill and provides prolonged, residual activity.

Please replace the Abstract of the Disclosure on page 34 with the following amended Abstract of the Disclosure:

Antimicrobial compositions that provide enhanced immediate and residual anti-viral and antibacterial efficacy against rhinovirus, rotavirus, coronovirus, respiratory ~~syricytial~~ syncytial virus, Gram-positive bacteria, Gram-negative bacteria and combinations thereof. More specifically, antimicrobial compositions comprising an organic acid or organic acid mixture and a short-chain anionic surfactant having at least one of a large head group; a branched alkyl chain and an unsaturated alkyl chain. Further, products incorporating the antimicrobial compositions of the present invention and methods of using the antimicrobial compositions and products are disclosed herein.